It is claimed:

1. An apparatus for use in performing a desired activity in an automated, microscale format, comprising:

a) a first substrate having a first workplace defining x-y coordinates;

not part of apparatus

b) one or more microparticles adapted for controlled movement adjacent said first workplace, each microparticle being adapted for having one or more magnetic or electrostatic dipoles, and one or more of said microparticles having one or more effectors;

c) a plurality of stations located at different known first workplace x-y coordinates, each station being adapted to carry out or participate in one or more selected operations with said microparticle effectors;

d) a first driving structure positioned adjacent said first workplace, said driving structure having a plurality of first-structure drive elements selectively energizable to move one or more of said microparticles between selected first workplace x-y coordinates, through interactions of said drive elements with said microparticles' dipoles; and,

e) one or more controllers operatively linked to said first-structure drive elements for energizing said first-structure drive elements to move said one or more selected microparticles between or among selected stations to accomplish said desired activity.

2. The apparatus of claim 1 further comprising:

a) a second substrate having a second workplace, said second substrate adapted to be placed adjacent said first substrate to form a continuous workplace with expanded x-y coordinates;

b) one or more additional stations being carried on said second substrate; and

c) a second driving structure positioned adjacent said second workplace, and having a plurality of second-structure drive elements selectively energizable to move one or more of said microparticles between selected second workplace x-y coordinates, through interaction of said second-structure drive elements with said microparticles' dipoles,

wherein said controller is operatively linked to said second-structure drive elements for energizing said second-structure drive elements to move one or more selected microparticles between or among selected stations on said second substrate, and said first-structure and second-structure drive elements are energizable to move one or more of said microparticles from one substrate to another.

3. The apparatus of claim 1 further comprising:

a) a second substrate adapted to be placed adjacent said first substrate to augment microparticle movement within said first or second workplace having x-y coordinates; and

b) a second driving structure positioned adjacent said second substrate, and having a plurality of second-structure drive elements selectively energizable to move one or more of said microparticles between selected first or second workplace x-y coordinates, through interaction of said second-structure drive elements with said microparticles' dipoles,

wherein said controller is operatively linked to said second-structure drive elements for energizing said second-structure drive elements to move one or more selected microparticles between or among selected stations, and said second-structure drive elements are energizable to move one or more of said microparticles between said first substrate and said second substrate.

4. The apparatus of claim 1, wherein said driving structure further includes one or more biasing elements effective to impart vertical, z-dimension forces to microparticles positioned or moving on said substrate, to move one or more selected microparticles to different selected z-axis positions, or to control movement of said microparticles in a z direction.

5. The apparatus of claim 1, wherein one or more of said stations include a chamber for holding a selected liquid, and a chamber opening that defines a gas/liquid interface.

6. The apparatus of claim 5, wherein one or more of said driving elements, when energized, move one or more of said microparticles across said gas/liquid interface into and out of said chamber.

7. The apparatus of claim 5, wherein said controller is designed or configured to activate said drive elements to accelerate the microparticles crossing said interface in a gas-to-liquid direction, and to accelerate, then brake the microparticles crossing said interface in a liquid-to-gas direction.

8. The apparatus of claim 1, wherein said activity is laboratory activity comprising one of chemical synthesis, single- or multi-analyte diagnostics, and high-throughput screening.

9. The apparatus of claim 1, wherein said stations are adapted to hold one of a chemical reagent, a wash reagent, or biological moiety.

10. The apparatus of claim 9, wherein said biological moiety comprise one of oligonucleotides, DNA, protein, enzyme, antibody, antigen, cells, and a body fluid of a human or animal.

11. The apparatus of claim 1, wherein said microparticles comprise surface-attached chemical groups on which chemical compounds can be synthesized.

12. The apparatus of claim 1, for use in a method that relies on a binding reaction between first and second compounds or a first compound and a biological cell, wherein at least one of said microparticles has surface attached first compound, and at least one of said laboratory stations contains said second compound, or biological moieties.

13. The apparatus of claim 1, for transferring material from one station to another, wherein one or more of said microparticles includes an effector for picking up and carrying such material from one station and for depositing said material at a second station.

14. The apparatus of claim 1, wherein one or more of said microparticles are adapted for moving in a levitated state.

15. The apparatus of claim 14 further comprising one or more diamagnetic layers defining a levitation surface wherein said microparticles are adapted to stably levitate by diamagnetic levitation. = dielectrophoresis???

16. The apparatus of claim 14 wherein said levitated state results wholly or in-part from electrostatic levitation, buoyant levitation, or surface tension levitation.

17. The apparatus of claim 14 further comprising one or more biasing elements for causing said microparticles to move toward or away from said biasing elements.

18. An apparatus for use in performing one or more desired activities in an automated, microscale format, comprising:

a) a substrate forming a workplace expanse having an upper surface;

b) one or more stations formed within or adjacent said substrate;

c) one or more trenches formed within said substrate, said trenches interconnecting said stations in a selected format to form at least one intersection, said trenches being capable of holding one or more liquids;

d) one or more microparticles adapted to movably fit within said trenches, said microparticles each having one or more magnetic or electrostatic dipoles and one or more effectors;

e) a driving structure positioned adjacent said workplace, said driving structure having a plurality of drive elements selectively energizable to move one or more of said microparticles through said trenches, through interactions of said drive elements with said microparticles' dipoles; and

f) a controller operatively linked to said drive elements for energizing said drive elements to move said one or more selected microparticles between or among selected stations interconnected by said trenches to accomplish said one or more desired activities.

19. The apparatus of claim 18 further comprising one or more cover structures adapted to fit against said substrate's upper surface to form therein one or more channels from said trenches.

20. The apparatus of claim 18 further comprising two or more electrodes for selectively passing one or more electrical currents through said trenches when said trenches are filled with one or more conductive media, wherein said electrical currents are capable of electrokinetically causing or controlling movement of one or more reagents or analytes within said trenches and between said laboratory stations so that said reagents transiently contact one or more of selected microparticles when said selected microparticles reside at said intersections.

21. The apparatus of claim 20 further comprising:

a) a wash reservoir connected by a first trench to a first drain reservoir; and

b) a reagent reservoir connected by a second trench to a second drain reservoir,

wherein said first and second trenches intersect to form an intersection for transiently exposing a microparticle to a reagent, said reservoirs each having disposed therein an electrode adapted to electrically communicate with a liquid contained within

said reservoirs so that when a first electrical current is passed between said reagent reservoir electrode and said second drain reservoir electrode, reagent is electrokinetically introduced into said intersection for contacting with a selected microparticle passing along said first trench through said intersection.

22. The apparatus of claim 21 further comprising one or more cover structures adapted to fit against said substrate's upper surface to form therein one or more channels from said trenches.

23. The apparatus of claim 22 wherein said intersection forms an offset double-tee intersection.

24. The apparatus of claim 18 further comprising one or more biasing elements positioned adjacent said one or more intersection for selectively holding said selected microparticles within said intersections.

25. The apparatus of claim 18 wherein said microparticle is adapted for moving within said device in a levitated state.

26. The apparatus of claim 25 further comprising one or more diamagnetic layers defining a levitation surface wherein said microparticles are adapted to stably levitate by diamagnetic levitation.

27. The apparatus of claim 25 wherein said levitated state results wholly or in-part from electrostatic levitation.

28. The apparatus of claim 25 wherein said levitated state results wholly or in-part from buoyant levitation.

29. The apparatus of claim 25 wherein said levitated state results wholly or in-part from surface tension levitation.

30. The apparatus of claim 25 wherein said levitated state occurs transiently.

31. The apparatus of claim 25 further comprising one or more biasing elements for causing said microparticles to move toward or away from said biasing elements.

32. A method for performing one or more desired activities in an automated, microscale format, comprising the steps of:

i) providing an apparatus having

a) a substrate forming a workplace expanse having an upper surface;

b) one or more stations formed within or adjacent said substrate;

c) one or more trenches formed within said substrate, said trenches interconnecting said stations in a selected format to form at least one intersection, said trenches being capable of holding one or more liquids;

d) one or more microparticles adapted to movably fit within said trenches, said microparticles each having one or more magnetic or electrostatic dipoles and one or more effectors;

e) a driving structure positioned adjacent said workplace, said driving structure having a plurality of drive elements selectively energizable to move one or more of said microparticles through said trenches, through interactions of said drive elements with said microparticles' dipoles; and

f) a controller operatively linked to said drive elements for energizing said drive elements to move said one or more selected microparticles between or among selected stations interconnected by said trenches to accomplish said one or more desired activities,

and,

ii) operating said controller to cause selected microparticles to selectively move between a selected sequence of stations in said apparatus to carry out said one or more desired activities with said selected microparticles.

33. The method of claim 32 where said method further comprising the steps of:

iii) further providing said apparatus with two or more electrodes for selectively passing one or more electrical currents through said trenches when said trenches are filled with one or more conductive media, wherein said electrical currents are capable of electrokinetically causing or controlling movement of one or more reagents or analytes within said trenches and between said laboratory stations so that said reagents transiently

contact one or more of selected microparticles when said selected microparticles reside at said intersections,

iv) activating at least one of said electrodes for pass current through at least one channel,

and,

v) operating said controller to move at least one microparticle into said channel where current is passed, so that said reagents moving in said channel contact said microparticle or said microparticle's effector if present.

34. The method claim 33 wherein said apparatus further comprises:

a) a wash reservoir connected by a first trench to a first drain reservoir; and

b) a reagent reservoir connected by a second trench to a second drain reservoir,

wherein said first and second trenches intersect to form an intersection for transiently exposing a microparticle to a reagent, said reservoirs each having disposed therein an electrode adapted to electrically communicate with a liquid contained within said reservoirs,

and,

said method further comprises the steps of:

v) passing a first electrical current between said reagent reservoir electrode and said second drain reservoir electrode, so that said reagent is electrokinetically introduced into said intersection and contacts said selected microparticle passing along said first trench through said intersection.

35. A method for carrying out one or more desired activities in an automated, microscale format comprising:

a) providing a device having therein one or more stations, and one or more microparticles, each microparticle adapted for having one or more dipoles, and at least one microparticle having at least one effector, said device having a driving substrate with one or more drive elements, said drive elements being capable of acting upon said microparticles' dipoles to cause said microparticles to selectively move about said device to assume one or more different positions within said device; and

b) controlling said movement of said microparticles from said positions within said device by activating selected drive elements to cause said microparticles to move between selected stations so that at least one of said selected microparticles is acted upon by selected stations in a desired sequence and manner.

36. An apparatus for use in performing one or more desired laboratory activities in an automated, microscale format, comprising:

a) a first substrate having a workplace defining x-y coordinates;

b) one or more microparticles adapted to levitate adjacent said workplace, said microparticles each having a magnetic or electrostatic dipole, and at least one of said microparticles having one or more laboratory effectors;

c) a plurality of laboratory stations located at different known workplace x-y coordinates, each laboratory station being adapted to carry out or participate in one or more selected laboratory operations with said microparticle;

d) a driving structure positioned adjacent said workplace, said driving structure having a plurality of drive elements selectively energizable to move one or more of said microparticles between selected workplace x-y coordinates, with said microparticles in a levitated state, through interactions of said drive elements with said microparticles' dipoles; and

e) a controller operatively linked to said drive elements for energizing said drive elements to move said one or more selected microparticles between or among selected laboratory stations to accomplish said desired one or more laboratory activities.

37. An apparatus for use in performing one or more desired activities in an automated, microscale format, comprising:

a) a first substrate having a workplace defining x-y coordinates;

b) one or more microparticles adapted to levitate adjacent said workplace, said microparticles each having a magnetic or electrostatic dipole, and at least one of said microparticles having one or more effectors;

c) a plurality of laboratory stations located at different known workplace x-y coordinates, each station being adapted to carry out or participate in one or more selected operations with said microparticle;

d) a driving structure positioned adjacent said workplace, said driving structure having a plurality of drive elements selectively energizable to move one or more of said microparticles between selected workplace x-y coordinates...

microparticles between selected workplace x-y coordinates, with said microparticles in a levitated state, through interactions of said drive elements with said microparticles' dipoles; and

e) a controller operatively linked to said drive elements for energizing said drive elements to move said one or more selected microparticles between or among selected stations to accomplish said desired one or more activities.

38. The apparatus of claim 37, wherein said first substrate has a diamagnetic layer, said one or more microparticles are magnetic microparticles, and said microparticles levitate adjacent said workplace by diamagnetic levitation.

39. The apparatus of claim 37, wherein said substrate is adapted to support a layer of fluid in which said microparticles are buoyant, and said microparticles levitate adjacent said workplace by buoyancy.

40. The apparatus of claim 37, wherein said substrate is adapted to support a layer of fluid having a surface displaying surface tension upon which said microparticles are supported against.

41. The apparatus of claim 40, wherein said microparticles have a density greater than that of said fluid, and said surface tension is sufficient to support said microparticle above said surface.

42. The apparatus of claim 40 wherein said microparticles have a density greater than that of said fluid, and said surface tension is sufficient to retain said microparticles below said surface when upwardly biased.

43. The apparatus of claim 37 further comprising:

a) a second substrate having a second workplace, said second substrate adapted to be placed adjacent said first substrate to form a continuous workplace with expanded x-y coordinates;

b) additional laboratory stations carried on said second substrate; and

c) a second driving structure positioned adjacent said second workplace, and having a plurality of second-structure drive elements selectively energizable to move one or more

of said microparticles between selected second workplace x-y coordinates, with said microparticles in a levitated state, through interaction of said second-structure drive elements with said microparticles' dipoles,

wherein said controller is operatively linked to said second-structure drive elements for energizing said second-structure drive elements to move one or more selected microparticles between or among selected laboratory stations on said second substrate, and said drive elements of said two drive structures are energizable to move microparticles from one substrate to another.

44. The apparatus of claim 37 further comprising:

a) a second substrate adapted to be placed adjacent said first substrate to augment microparticle levitation within said first or second workplace having x-y coordinates; and

b) a second driving structure positioned adjacent said second substrate, and having a plurality of second-structure drive elements selectively energizable to move one or more of said microparticles between selected first or second workplace x-y coordinates, with said microparticles in a levitated state, through interaction of said second-structure drive elements with said microparticles' dipoles,

wherein said controller is operatively linked to said second-structure drive elements for energizing said second-structure drive elements to move one or more selected microparticles between or among selected laboratory stations, and said second-structure drive elements are energizable to move microparticles between said first substrate and said second substrate.

45. The apparatus of claim 37, wherein said driving structure further includes one or more biasing elements effective to impart vertical, z-dimension forces to microparticles levitating on said substrate, to move one or more selected microparticles to different selected z-axis positions, or to control movement of said microparticles in a z direction.

46. The apparatus of claim 37, wherein one or more of said laboratory stations include a chamber for holding a selected liquid, and an chamber opening which defines a gas/liquid interface..

47. The apparatus of claim 46, wherein one or more of said driving elements, when energized, move one or more of said microparticles across said gas/liquid interface into and out of said chamber.

48. The apparatus of claim 46, wherein the controller is designed or configured to activate the drive elements to accelerate microparticles crossing said interface in a gas-to-liquid direction and to accelerate, then brake microparticles crossing said interface in a liquid-to-gas direction.

49. The apparatus of claim 46, wherein said activity is a laboratory activity comprising one of chemical synthesis, single- or multi-analyte diagnostics, and high-throughput screening.

50. The apparatus of claim 46, wherein said laboratory stations are adapted to hold one of a chemical reagent, a wash reagent, or biological moiety.

51. The apparatus of claim 50, wherein said biological moiety comprises one of oligonucleotides, DNA, protein, enzyme, antibody, antigen, cells, and a body fluid of a human or animal.

52. The apparatus of claim of claim 37, wherein one or more said microparticles comprise surface-attached chemical groups on which chemical compounds can be synthesized.

53. The apparatus of claim 38, for use in a method that relies on a binding reaction between first and second compounds or a first compound and a biological cell, wherein at least one of said microparticles has surface attached first compound, and at least one of said laboratory stations contains said second compound or biological cells.

54. The apparatus of ~~claim~~ claim 37, for transferring material from one laboratory station to another, wherein at least one of said microparticles includes an effector for picking up and carrying such material from one station and for depositing said material at a second station.

55. A microparticle for use in carrying out micro-scale activities comprising:

a) a magnetic substrate characterized by (i) a surface having a maximum dimension between about 50 micrometers and about 3 millimeters, (ii) a first magnetic dipole whose magnetic field lines are substantially normal to said surface, and (iii) an energy density of at least10 megagauss-oersted, such that said microparticle, when placed flat-surface down on a diamagnetic surface, is able to levitate on said surface; and

b) a region on said magnetic substrate having an effector for carrying out or participating in a selected chemical operation.

56. The microparticle of claim 55, wherein said magnetic substrate is formed of rare earth metals.

57. The microparticle of claim 55, wherein the microparticle is substantially disc shaped, spherical, or spheroidal.

58. The microparticle of claim 55, wherein said surface has a maximum dimension between about 50 and about 500 microns.

59. The microparticle of claim 55, further comprising positionally encoded indicia readable by a code reader, for purposes of identifying said microparticle.

60. The microparticle of claim 55, wherein said effector includes surface-attached biopolymer molecules.

61. The microparticle of claim 55, wherein said effector includes surface-attached chemical groups that can support polymer synthesis.

62. The microparticle of claim 60, wherein said surface-attached chemical groups are functional groups adapted for polymer synthesis.

63. The microparticle of claim 55, wherein said effector is a manipulator effective to interact with other microparticles to transfer chemical material to or from such other microparticles.

64. The microparticle of claim 55, wherein said effector is a sensor adapted to sense a target material or event.

65. The microparticle of claim 55, formed of two or more regions with oppositely directed magnetic poles.

66. An apparatus for exposing a microparticle to a plurality of liquid, comprising:

a) a diamagnetic substrate having a workplace defining x-y coordinates, and on which said microparticle can levitate;

b) a plurality of stations located at different known workplace x-y coordinates, each station having a chamber for holding a selected liquid, and a chamber opening forming a gas/liquid interface when said chamber contains such liquid, each station being adapted to carry out or participate in one or more selected operations;

c) a driving structure positioned adjacent said workplace, said driving structure having (i) a first set of drive elements selectively energizable to cause an interaction between selected energized drive elements and one or more selected microparticles, to move said microparticles between selected workplace x-y coordinates, with said microparticles in a levitated state, through interaction of said drive element with said microparticles' dipoles, and (ii) a second set of drive elements associated with each station, selectively energizable to cause an interaction between selected energized drive elements and one or more selected microparticles, to move said microparticles across said gas/liquid interfaces at said laboratory stations; and

d) a controller operatively linked to said first and second sets of drive elements for energizing said first and second sets of drive elements to move said one or more selected microparticles between or among selected laboratory stations, and in and out of laboratory stations, to accomplish said desired laboratory-activity.

67. The apparatus of claim 66, wherein said laboratory stations are substantially in-plane with said x-y movement of said microparticles on said substrate, and said chamber opening includes a capillary port communicating between interior of said chamber and said workplace.

68. The apparatus of claim 66, wherein said second set of drive elements includes, for each station, an exterior drive element on said external side of said station's port, and an internal drive element on said internal side of said station's port.

69. The apparatus of claim 66, wherein said interior and exterior drive elements each includes first and second electromagnetic coils disposed on opposite lateral sides of said capillary port.

70. The apparatus of claim 68, wherein said interior drive element associated with each station is energizable to move said microparticles into said chamber, and said exterior drive element associated with each station is energizable to move said microparticles out of said chamber.

71. The apparatus of claim 70, wherein the movement out of the chamber further comprising braking after accelerating.

72. The apparatus of claim 71, wherein said braking further includes de-energizing said drive element, and using said liquid to brake said microparticle.

73. The apparatus of claim 71, wherein said braking further includes a combination of reverse energizing said drive element to brake said microparticle along with using said fluid to further brake said microparticle.

74. The apparatus of claim 71, wherein said braking is entirely achieved by reverse-energizing said drive element.

75. The apparatus of claim 66 wherein one of more said laboratory stations has one or more chambers, each chamber separated from other chambers by a capillary port designed or configured to contain a gas and defines a gas/liquid interface between each chamber and said capillary port, when said chambers are filled in liquid.

76. The apparatus of claim 75, wherein a plurality of laboratory stations are arranged in a hub-and-spoke arrangement comprising a central station having a chamber with one or more central station connecting ports, and radial-spoke stations, one or more of

said spoke stations having a chamber and one or more connecting ports, at least one of said spoke station connecting ports, and said hub station connecting ports having a capillary segment intended to contain a gas and define a gas/liquid interface between each chamber and said capillary port, when said chambers are filled with a liquid.

77. The apparatus of claim 66, wherein said chamber is defined by a cavity formed in said substrate, said chamber opening is formed by an upper surface of liquid contained in said cavity, and said second set of drive elements are energizable to move said microparticles in a substantially z direction across said gas/liquid interface into and out of said chamber.

78. The apparatus of claim 77, wherein said second set of drive elements associated with such cavity-defined chamber include, exterior and interior drive elements disposed on exterior and interior sides of said chamber opening, respectively.

79. A method of ejecting a microparticle from a liquid comprising the steps of:

i) providing the device of claim 78,

ii) selectively energizing said interior drive element associated with a station to accelerate microparticles external to said gas/liquid downwardly across said gas/liquid interface into said station's chamber,

iii) selectively energizing said exterior drive element associated with said station to initially accelerate said microparticles within said station's chamber upwardly, as said microparticle passes through said liquid/gas interface, and

iv) then selectively energizing said exterior drive element to brake said movement of said microparticle after it has passed such interface.

80. An apparatus for use in performing multi-particle operations, comprising:

a) a substrate having a workplace defining x-y coordinates;

b) a plurality of microparticles adapted to levitate adjacent said workplace, said microparticles each having a magnetic dipole;

c) a driving structure positioned adjacent said workplace, said driving structure having a plurality of drive elements selectively energizable to move a linear train of selected microparticles coordinately between selected workplace x-y coordinates, with said

microparticles in a levitated state, through interactions of said drive elements with said microparticles' dipoles; and

d) a controller operatively linked to said drive elements for energizing said drive elements to move said microparticles between or among selected x, y coordinates to accomplish said multi-particle operation.

81. The apparatus of claim 80, wherein said microparticles in said train are magnetically coupled in a direction of train movement.

82. The apparatus of claim 80, wherein said microparticles in said train are magnetically uncoupled in a direction of train movement.

83. The apparatus of claim 80, wherein said controller is designed or configured to add or remove selected microparticles to said train, as said train is moved from one region on said workplace to another.

84. A controller for controlling movement of one or more microparticles, said controller comprising:

a controller circuit adapted to send signals to energize one or more drive elements adjacent a workplace surface defined by a substrate, said one or more drive elements in communication with said controller, wherein said signals are selectively communicated to one or more selected drive elements to energize said selected drive elements to selectively produce an attracting force or a repelling force,

said one or more microparticles adapted to levitate adjacent said workplace surface by levitation condition, said one or more microparticles each having one or more polar regions, each of said one or more polar regions capable of being attracted by said attracting force or repelled by said repelling force,

wherein said attracting force causes at least one of said one or more microparticles adjacent said selected drive element to move towards said drive element, and said repelling force causes at least one of said one or more microparticles to move away from said energized drive element.

85. An apparatus for directing movement of microparticles within a micro laboratory device having therein one or more locations comprising:

a) a substrate having an upper surface;

b) one or more drive element track loops for moving said microparticles about said substrate surface , said loops each defining a loop path and each loop comprising a plurality of drive elements adapted to cause selective movement of said microparticles along said loop path by electrostatic or magnetic interactions between said microparticles and said drive elements so that a selected microparticle will move along a selected loop path when said drive elements of said loop are selectively activated;

c) one or more biasing elements adjacent one or more of said loop paths for attracting, holding, and/or repelling said microparticles traveling along said loop paths and by said biasing elements, said biasing elements being adapted to attract, hold, and/or repel said microparticles traveling by said biasing elements when activated; and

d) a controller device for selectively activating said drive elements of said loops and selectively activating said biasing elements to transiently form one or more routes between two or more desired locations within said device for causing directed movement selected microparticles to said desired locations within said microlaboratory device.

86. The apparatus of claim 85 further comprising:

a route formed by transiently creating an apparatus state of a first loop having

a first biasing element being adapted to hold and release a selected microparticle when activated and deactivated,

one or more second biasing elements being adapted to direct movement of said released microparticle from said first loop's path to one or more intermediate loops' paths subsequently adjacent said first loop's path when activated and deactivated,

and a third biasing element being adapted to attract and hold said released microparticle traveling along said intermediate loops' paths so that when said microparticle passes said third biasing element, said microparticle is captured and selectively held by said third biasing element.

87. The apparatus of claim 85 further comprising:

one or more loop detectors adapted for detecting said microparticles when passing by said loop detector, said loop detectors being in communication with said controller for providing feedback information on the movement of microparticles throughout said apparatus.

88. The apparatus of claim 87 wherein at least one loop detector is adapted to detect an identification code uniquely associated with each microparticle.

89. A method for directing movement of microparticles within a device having therein one or more locations comprising the steps of:

i) providing said device, said device having

a) a substrate having an upper surface;

b) one or more drive element track loops for moving said microparticles about said substrate surface , said loops each defining a loop path and each loop comprising a plurality of drive elements adapted to cause selective movement of said microparticles along said loop path by electrostatic or magnetic interactions between said microparticles and said drive elements so that a selected microparticle will move along a selected loop path when said drive elements of said loop are selectively activated;

c) one or more biasing elements adjacent one or more of said loop paths for attracting, holding, and/or repelling said microparticles traveling along said loop paths and by said biasing elements, said biasing elements being adapted to attract, hold, and/or repel said microparticles traveling by said biasing elements when activated; and

d) a controller device for selectively activating said drive elements of said loops and selectively activating said biasing elements; and,

ii) transiently forming one or more routes between two or more desired locations within said device and directing movement of selected microparticles to said desired locations within said microlaboratory device using said routes.

90. A method for performing one or more desired activities in an automated, microscale format, comprising the steps of:

i) providing a device having

a) a first substrate having a workplace defining x-y coordinates;

b) one or more microparticles adapted to levitate adjacent said workplace, said microparticles each having a magnetic or electrostatic dipole, and at least one of said microparticles having one or more effectors;

c) a plurality of stations located at different known workplace x-y coordinates, each station being adapted to carry out or participate in one or more selected operations with said microparticle;

d) a driving structure positioned adjacent said workplace, said driving structure having a plurality of drive elements selectively energizable

e) a controller operatively linked to said drive elements for energizing said drive elements

and,

ii) operating said controller to energize selected drive elements such that one or more of said microparticles ~~moves~~ between selected workplace x-y coordinates, with said microparticles in a levitated state, through interactions of said drive elements with said microparticles' dipoles to accomplish said desired one or more activities.